Designation: ~~D580/D580M – 10~~ D580/D580M – 15

Standard Specification for Greige Woven Glass Tapes and Webbings[1]

This standard is issued under the fixed designation D580/D580M; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This specification primarily covers greige tapes and webbings woven from "E" electrical classification glass fiber yarns. This specification can also be applied to tapes and webbings made of other glass fiber grades upon agreement between the purchaser and the supplier.

1.2 This specification is intended to assist ultimate users by designating the types of these products that are typical in the industry. This specification permits the application of organic materials to the glass fiber yarn during manufacture that helps facilitate weaving. When used as permitted in this specification, such materials will not interfere with the intended end use requirements.

1.3 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in nonconformance with the standard.

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

D123 Terminology Relating to Textiles
D578 Specification for Glass Fiber Strands
D579 Specification for Greige Woven Glass Fabrics
D1059 Test Method for Yarn Number Based on Short-Length Specimens (Withdrawn 2010)[3]
D1423 Test Method for Twist in Yarns by Direct-Counting
D1776 Practice for Conditioning and Testing Textiles
D1777 Test Method for Thickness of Textile Materials
D3773 Test Methods for Length of Woven Fabric
D3774 Test Method for Width of Textile Fabric
D3775 Test Method for Warp (End) and Filling (Pick) Count of Woven Fabrics
D4963 Test Method for Ignition Loss of Glass Strands and Fabrics
D5035 Test Method for Breaking Force and Elongation of Textile Fabrics (Strip Method)
D7018 Terminology Relating to Glass Fiber and Its Products

2.2 *ANSI Standard:*[4]

ANSI/ASQC Z1.4 Sampling Procedures for Inspection by Attributes

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 For definitions of glass fiber and product terms used in this specification refer to Terminology D7018.

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[1] This specification is under the jurisdiction of ASTM Committee D13 on Textiles and is the direct responsibility of Subcommittee D13.18 on Glass Fiber and its Products.
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[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

[3] The last approved version of this historical standard is referenced on www.astm.org.

[4] Available from American National Standards Institute, 11 W. 42nd St., 13th Floor, New York, NY 10036.

3.1.2 The following terms are relevant to this standard: *continuous filament yarn, greige goods, tape, webbing*.

3.1.3 For definitions of other textile terminology used in this specification, refer to Terminology D123.

4. Classification

4.1 Greige glass fiber tapes and webbings are produced in two types and are constructed with yarns designated as directed in Specification D578. The standard types are:

4.1.1 *Type A*—Medium texture.

4.1.2 *Type B*—Open texture.

4.2 The designation of a tape or webbing shall be by style numbers that are standard throughout the industry.

4.3 Two segments of characters are used to describe tapes and webbings.

4.3.1 The first segment of the description of tape or webbing describes the glass classification, the type fiber in the warp, and the type fiber in the filling.

4.3.1.1 The first letter in the first segment is one of the following glass classification codes: "E" for electrical," C" for chemical, "S" for high ~~strength.~~force.

4.3.1.2 The second letter in the first segment specifies the fiber type in the warp direction: "C" describes continuous filament fiber using either SI units or inch-pound units, staple (discontinuous) fiber is described by "D" in SI units or "S" in inch-pound units.

4.3.1.3 The third letter in the first segment specifies the fiber type in the filling direction: "C" describes continuous filament fiber using either SI units or inch-pound units, staple (discontinuous) fiber is described by "D" in SI units or "S" in inch-pound units.

4.3.2 The second segment of the description of tape or webbing describes the texture: "A" describes medium texture and" B" describes close texture.

4.4 Examples of glass fiber tapes or webbings.

4.4.1 Example 1a (SI units):

$$ECD - B \tag{1}$$

where:

E = electrical glass,
C = continuous filament yarn warp direction,
D = discontinuous (staple) yarn filling direction, and
B = close textured.

4.4.2 Example 1b [inch-pound units]:

$$ECS - B \tag{2}$$

where:

E = electrical glass,
C = continuous filament yarn warp direction,
S = staple (discontinuous) filament yarn filling direction, and
B = close textured.

REQUIREMENTS

5. Material

5.1 The fiber shall be continuous filament or staple (discontinuous) fiber, as agreed upon between the purchaser and supplier, free of any free alkali metal salts, such as soda or potash, and foreign particles, dirt, and other impurities.

6. Fabric Count

6.1 For tapes listed in Tables 1 and 2, and webbings listed in Table 3, the nominal fabric count shall conform to the requirements of Table 1, Table 2, and Table 3, respectively. For tapes or webbings not listed in Table 1, Table 2, and Table 3, the nominal fabric count shall be agreed upon between the purchaser and the supplier. The average count of warp ends shall be within one end of the nominal count and the average count of the filling picks shall be within two picks of the nominal count.

7. Yarn Designations

7.1 For tapes and webbings, the yarn designations shall be as agreed upon between the purchaser and supplier. The requirements of the individual elements of the designation are specified in Sections 8 – 12.

8. Yarn Number

8.1 For tapes and webbings, the nominal size-free yarn numbers of the yarns designated shall conform to Specification D578.

TABLE 1 Physical Properties of Generally Available "E" Glass Greige Woven Glass Continuous Filament Tape, Plain Weave

Tape No.	Thickness		Width		Total Ends	Pick Count		Length per Unit Mass		Minimum Breaking Strength	
	mm	in.	mm	in.		25 mm	in.	tex	yd/lb	N	lbf
ECC-A	0.130	0.005	12.7	½	24	34	35	1923	258	445	100
			19.0	¾	32	34	35	2681	185	600	135
			25.4	1	42	34	35	3543	140	712	160
			25.4	1	36	33	34	3398	146	712	160
			38.1	1½	62	34	35	5222	95	1112	250
			50.8	2	72	33	34	6795	73	1334	300
			63.5	2½	104	34	35	9186	54	1557	350
			76.2	3	108	33	34	10124	49	2224	500
			102.0	4	144	33	34	13407	37	2513	565
ECC-A	0.180	0.007	12.7	½	24	31	32	2771	179	578	130
			19.0	¾	32	31	32	3875	128	778	175
			25.4	1	42	31	32	5114	97	1068	240
			38.1	1½	62	31	32	7404	67	1646	370
			50.8	2	88	31	32	10334	48	2313	520
	0.255	0.010	12.7	½	16	21	21	3730	133	712	160
			19.0	¾	24	21	21	5574	89	1112	250
			25.4	1	32	21	21	7295	68	1557	350
			38.1	1½	48	21	21	11023	45	2446	550
ECC-A	0.380	0.015	12.7	½	14	16	16	5222	95	934	210
			19.0	¾	20	16	16	7516	66	1423	320
			25.4	1	26	16	16	9921	50	1957	440
			38.1	1½	40	16	16	15032	33	2936	660
ECC-B	0.075	0.003	9.5	⅜	21	41	42	800	620	200	45
			12.7	½	30	41	42	1184	419	267	60
			19.0	¾	45	41	42	1759	282	423	95
			25.4	1	63	41	42	2408	206	600	135
			38.1	1½	108	41	42	4066	122	845	190
	0.130	0.005	9.5	⅜	21	38	39	1778	279	512	115
			12.7	½	27	38	39	2297	216	600	135
			19.0	¾	39	38	39	3329	149	1001	225
			25.4	1	51	38	39	4390	113	1379	310
			38.1	1½	75	38	39	6442	77	1957	440
ECC-B	0.178	0.007	9.5	⅜	21	38	39	2147	231	512	115
			12.7	½	27	38	39	2771	179	600	135
			38.1	¾	39	38	39	4033	123	1001	225
			25.4	1	51	38	39	5277	94	1379	310
			38.1	1½	75	38	39	7874	63	1957	440

TABLE 1 Physical Properties of Generally Available "E" Glass Greige Woven Glass Continuous Filament Tape, Plain Weave

Tape No.	Thickness		Width		Total Ends	Pick Count		Length per Unit Mass		Minimum Breaking Force	
	mm	in.	mm	in.		25 mm	in.	tex	yd/lb	N	lbf
ECC-A	0.130	0.005	12.7	½	24	34	35	1923	258	445	100
			19.0	¾	32	34	35	2681	185	600	135
			25.4	1	42	34	35	3543	140	712	160
			25.4	1	36	33	34	3398	146	712	160
			38.1	1½	62	34	35	5222	95	1112	250
			50.8	2	72	33	34	6795	73	1334	300
			63.5	2½	104	34	35	9186	54	1557	350
			76.2	3	108	33	34	10124	49	2224	500
			102.0	4	144	33	34	13407	37	2513	565
ECC-A	0.180	0.007	12.7	½	24	31	32	2771	179	578	130
			19.0	¾	32	31	32	3875	128	778	175
			25.4	1	42	31	32	5114	97	1068	240
			38.1	1½	62	31	32	7404	67	1646	370
			50.8	2	88	31	32	10334	48	2313	520
	0.255	0.010	12.7	½	16	21	21	3730	133	712	160
			19.0	¾	24	21	21	5574	89	1112	250
			25.4	1	32	21	21	7295	68	1557	350
			38.1	1½	48	21	21	11023	45	2446	550
ECC-A	0.380	0.015	12.7	½	14	16	16	5222	95	934	210
			19.0	¾	20	16	16	7516	66	1423	320
			25.4	1	26	16	16	9921	50	1957	440

Tape No.	Thickness		Width		Total Ends	Pick Count		Length per Unit Mass		Minimum Breaking Force	
	mm	in.	mm	in.		25 mm	in.	tex	yd/lb	N	lbf
			38.1	1½	40	16	16	15032	33	2936	660
ECC-B	0.075	0.003	9.5	⅜	21	41	42	800	620	200	45
			12.7	½	30	41	42	1184	419	267	60
			19.0	¾	45	41	42	1759	282	423	95
			25.4	1	63	41	42	2408	206	600	135
			38.1	1½	108	41	42	4066	122	845	190
	0.130	0.005	9.5	⅜	21	38	39	1778	279	512	115
			12.7	½	27	38	39	2297	216	600	135
			19.0	¾	39	38	39	3329	149	1001	225
			25.4	1	51	38	39	4390	113	1379	310
			38.1	1½	75	38	39	6442	77	1957	440
ECC-B	0.178	0.007	9.5	⅜	21	38	39	2147	231	512	115
			12.7	½	27	38	39	2771	179	600	135
			38.1	¾	39	38	39	4033	123	1001	225
			25.4	1	51	38	39	5277	94	1379	310
			38.1	1½	75	38	39	7874	63	1957	440

TABLE 2 Physical Properties of Generally Available "E" Glass Greige Woven Glass Staple (Discontinuous) Filament Tape, Plain Weave

~~Tape No.~~	~~Thickness~~		~~Width~~		~~Total Ends~~	~~Pick Count~~		~~Length per Unit Mass~~		~~Minimum Breaking Strength~~	
	mm	in.	mm	in.		25 mm	in.	tex	yd/lb	N	lbf
~~ESS-A~~	~~0.255~~	~~0.010~~	~~12.7~~	~~½~~	~~18~~	~~21~~	~~21~~	~~3906~~	~~127~~	~~445~~	~~100~~
			~~19.0~~	~~¾~~	~~26~~	~~21~~	~~21~~	~~5977~~	~~83~~	~~667~~	~~150~~
			~~25.4~~	~~1~~	~~34~~	~~21~~	~~21~~	~~7632~~	~~65~~	~~890~~	~~200~~
			~~38.1~~	~~1½~~	~~52~~	~~21~~	~~21~~	~~11811~~	~~42~~	~~1334~~	~~300~~
	~~0.038~~	~~0.015~~	~~19.0~~	~~¾~~	~~20~~	~~16.5~~	~~16.5~~	~~8268~~	~~60~~	~~890~~	~~200~~
			~~25.4~~	~~1~~	~~28~~	~~16.5~~	~~16.5~~	~~11023~~	~~45~~	~~1112~~	~~250~~
			~~38.1~~	~~1½~~	~~52~~	~~16.5~~	~~16.5~~	~~17105~~	~~29~~	~~1557~~	~~350~~

TABLE 2 Physical Properties of Generally Available "E" Glass Greige Woven Glass Staple (Discontinuous) Filament Tape, Plain Weave

Tape No.	Thickness		Width		Total Ends	Pick Count		Length per Unit Mass		Minimum Breaking Force	
	mm	in.	mm	in.		25 mm	in.	tex	yd/lb	N	lbf
ESS-A	0.255	0.010	12.7	½	18	21	21	3906	127	445	100
			19.0	¾	26	21	21	5977	83	667	150
			25.4	1	34	21	21	7632	65	890	200
			38.1	1½	52	21	21	11811	42	1334	300
	0.038	0.015	19.0	¾	20	16.5	16.5	8268	60	890	200
			25.4	1	28	16.5	16.5	11023	45	1112	250
			38.1	1½	52	16.5	16.5	17105	29	1557	350

9. Filament Diameter

9.1 The nominal values for the filament diameters when agreed upon between purchaser and supplier are listed in Table 1 of Specification D578. The average filament diameter for the yarns in the tape or webbing shall conform to Specification D578 for the specified filament diameter.

10. Strand Construction

10.1 The basis for specifying strand construction is given in Specification D578. The construction of the component strands shall be agreed upon between the purchaser and the supplier.

11. Direction of Twist

11.1 Unless otherwise agreed upon between the purchaser and the supplier, the primary twist in the singles strands shall be "Z" twist and the final twist in the plied yarns shall be "S" twist.

12. Twist Level

12.1 The nominal twist in the component strands and the finished yarns shall be agreed upon between the purchaser and supplier. The tolerances for the primary twist and the final twist shall conform to Table 4.

TABLE 3 Physical Properties of Generally Available "E" Glass Greige Woven Glass Staple (Discontinuous) Filament Webbing, Plain Weave

Tape No.	Thickness		Width		Total Ends	Pick Count		Length per Unit Mass		Minimum Breaking Strength	
	mm	in.	mm	in.		25 mm	in.	tex	yd/lb	N	lbf
ESS-A	0.510	0.020	19.0	¾	20	14	14	10124	49	1112	250
			25.4	1	28	14	14	13779	36	1334	300
			38.1	1½	44	14	14	19842	25	2002	450
	0.635	0.025	19.0	¾	20	10	10	11274	44	934	210
			25.4	1	28	10	10	15502	32	1334	300
			38.1	1½	44	10	10	27559	18	2446	550

TABLE 3 Physical Properties of Generally Available "E" Glass Greige Woven Glass Staple (Discontinuous) Filament Webbing, Plain Weave

Tape No.	Thickness		Width		Total Ends	Pick Count		Length per Unit Mass		Minimum Breaking Force	
	mm	in.	mm	in.		25 mm	in.	tex	yd/lb	N	lbf
ESS-A	0.510	0.020	19.0	¾	20	14	14	10124	49	1112	250
			25.4	1	28	14	14	13779	36	1334	300
			38.1	1½	44	14	14	19842	25	2002	450
	0.635	0.025	19.0	¾	20	10	10	11274	44	934	210
			25.4	1	28	10	10	15502	32	1334	300
			38.1	1½	44	10	10	27559	18	2446	550

TABLE 4 Twist Tolerances

	Tolerances
Turns per Centimeter:	
From zero to 0.4	±0.1 turn per centimeter
Over 0.4 and up to and including 4.0	±0.2 turn per centimeter
Over 4	±5.0 % of the specified average twist
Turns per Meter:	
From zero to 40, incl	±10 turns per meter
Over 40 and up to and including 400	±20 turns per meter
Over 400	±5.0 % of the specified av erage twist
Turns per Inch:	
From zero to 1	±0.25 turn per inch
Over 1 and up to and including 10	±0.5 turn per inch
Over 10	±5.0 % of the specified average twist

TABLE 4 Twist Tolerances

	Tolerances
Turns per Centimeter:	
From zero to 0.4	±0.1 turn per centimeter
Over 0.4 and up to and including 4.0	±0.2 turn per centimeter
Over 4	±5.0 % of the specified average twist
Turns per Meter:	
From zero to 40, incl	±10 turns per meter
Over 40 and up to and including 400	±20 turns per meter
Over 400	±5.0 % of the specified av erage twist
Turns per Inch:	
From zero to 1	±0.25 turn per inch
Over 1 and up to and including 10	±0.5 turn per inch
Over 10	±5.0 % of the specified average twist

13. Tape Weave Type

13.1 For tapes listed in Tables 1 and 2 and webbings listed in Table 3, the weave type shall be plain weave. For tapes and webbings not listed in Table 1, Table 2, and Table 3, the weave type shall be agreed upon between the purchaser and the supplier.

14. Length per Unit Mass

14.1 For tapes listed in Tables 1 and 2, and webbings listed in Table 3, the nominal length per unit mass shall conform to the requirements of Table 1, Table 2, and Table 3, respectively. For tapes and webbings not listed in Table 1, Table 2, and Table 3, the nominal length per unit mass shall be agreed upon between the purchaser and the supplier. The average length per unit mass for the lot shall be within the interval: specified length per unit mass ±10 %.

15. Thickness

15.1 For tapes listed in Tables 1 and 2, and webbings listed in Table 3, the nominal thickness shall conform to the requirements of Table 1, Table 2, and Table 3, respectively. For tapes and webbings not listed in Table 1, Table 2, and Table 3, the nominal thickness shall be agreed upon between the purchaser and the supplier. The average thickness of the tape or webbing in the lot shall conform to the requirements of Table 5, unless specified otherwise.

16. Breaking ~~Strength~~Force

16.1 For tapes listed in Tables 1 and 2, and webbings listed in Table 3, the average breaking ~~strength~~force shall conform to the requirements of Table 1, Table 2, and Table 3, respectively. For tapes and webbings not listed in Table 1, Table 2, and Table 3, the average breaking ~~strength~~force shall be agreed upon between the purchaser and the supplier. The average breaking ~~strength~~force for the lot shall exceed the specified breaking ~~strength~~force and no individual break shall be less than 80 % of the specified average breaking ~~strength.~~force.

17. Width

17.1 For tapes listed in Tables 1 and 2, and webbings listed in Table 3, the nominal width shall conform to the requirements of Table 1, Table 2, and Table 3, respectively. For tapes and webbings not listed in Table 1, Table 2, and Table 3, the nominal width shall be agreed upon between the purchaser and the supplier. The tolerances for width shall conform to Table 6 unless otherwise agreed upon between the purchaser and the supplier.

18. Length Per Package

18.1 The nominal length of tape or webbing on each package, such as a spool or serving tube, shall be no more than 36 m [40 yd] nor no less than 32 m [36 yd] except for 0.075 mm [0.003 in.] thick tape or webbing which shall be no more than 68 m [76 yd] nor no less than 65 m [72 yd], unless otherwise agreed upon between the purchaser and the supplier.

18.2 Unless otherwise agreed upon between the purchaser and the supplier, no piece of tape or webbing shall be less than 14 m [15 yd] long and there shall be no more than two pieces in a package.

18.3 None of the sample tubes or serving spools shall contain more than the allowable pieces, and the combined length of all of the sample tubes or serving spools shall not be less than the combined length of those tubes or serving spools on the identification labels.

19. Ignition Loss

19.1 The organic content of greige tape or webbing shall be less than 4.0 % unless otherwise agreed upon between the purchaser and the supplier.

20. Visual Appearance

20.1 The woven greige tape or webbing shall be generally uniform in quality and condition, clean, smooth, and free of foreign particles and from defects detrimental to fabrication, appearance, or performance.

20.2 The tape or webbing in the laboratory sample for the visual appearance shall be examined on both sides for the defects listed in Table 7 and the acceptable quality levels (AQLs) shall be 0.65 major and 2.5 total (major and minor combined) defects per hundred units of tape or webbing unless otherwise agreed upon between the purchaser and the supplier.

21. Put-Up

21.1 The tape or webbing shall be furnished in rolls and shall be wound on suitable tubes or serving spools with cores of the same width as the tape or webbing, measuring 9.5 mm [⅜ in.] inside diameter, unless otherwise specified. The ends of the rolls shall be securely fastened with gummed tape to prevent slippage and unrolling of the tape or webbing. The maximum number of pieces contained in any roll shall be as specified in 18.2. The supplier may use his standard practice when agreed upon between the purchaser and the supplier.